IV. COMMONALITIES AND DIFFERENCES AMONG STRATEGIES

A. Renewables Program Implementation Proposals

The renewables working group has received six comprehensive proposals and two adjunct proposals for programs to implement the renewable energy policy embodied in the CPUC's December 20, 1995, decision on restructuring of the electric utility industry. The proposals offer a broad range of strategies to achieve the CPUC's objectives for renewable energy, and illustrate the complexity of developing an effective and successful program for the promotion of renewable energy sources within the context of a deregulated market for electricity generation. The adjunct proposals are targeted at promoting individual renewable energy technologies within the context of any of the comprehensive implementation programs.

There are a number of ways to separate the proposals into functional categories for purposes of comparing and contrasting them. This can be done in a hierarchical structure, as illustrated in Figure IV.1. The first category used for separating the proposals into functional categories concerns whether or not the proposed program is based on the establishment of a minimum renewables purchase requirement (MRPR). The next category level is based on the unit of measurement used by the proposed strategy, which can be either energy units (kWh) or capacity units (kW). The third category differentiates between proposals that do or do not include specified technology bands to promote targeted technologies. The fourth category addresses the issue of whether hydroelectric generating systems are included in the program. The final category concerns the issue of enforcement and penalties for compliance. This structure allows all six of the comprehensive program proposals to be differentiated with respect to their most significant functional differences.

A summary of the proposals and some of their distinguishing characteristics follows:

1. Comprehensive Program Proposals

a. Proposals With an MRPR Standard

Renewables Industry (AWEA/CBEA/GEA/STEA/UCS): Includes an MRPR, based on energy units, has one specified technology band for biomass, excludes hydro, and employs a high, punitive penalty intended to motivate full compliance with the standard.

IEP: Includes an MRPR, based on energy units, has one specified technology band for biomass, excludes hydro, and is predicated on voluntary compliance through green marketing by electricity providers, with a requirement for UDCs to purchase the necessary quantity of renewables to meet the MRPR standard, which will be enforced by PBR incentives.

NCPA: Includes an MRPR, based on capacity units, has no specified technology bands, includes hydro, and employs a penalty level that effectively caps the cost of compliance.

SCE/PG&E: Includes an MRPR, based on energy units, has no specified technology bands, excludes hydro, and employs a ceiling on the price of renewable energy credits that effectively caps the cost of compliance.

SMUD: Includes an MRPR, based on energy units, has no specified technology bands, includes hydro, and does not address the issue of enforcement and penalties.

b. Surcharge-Funded Production Credit Proposal

EDF/CalSEIA/Cambrian/Genesis/Laidlaw/LASD/Neo/Orange&SonomaCo./Sacramento/ SDG&E/PG&E/SCE: Based on a surcharge funding approach, rather than an MRPR, awards based on energy units, has no specified technology bands, excludes hydro, and is automatically capped at the cost assigned to the program.

2. Adjunct Proposals

BWG: Proposes to create a special-purpose "greenhouse environemtnal credits" (GECs) equal in value to a REC for the purpose of promoting the growth of electricity generation from landfill gas and other biogas sources, and, in so doing, mitigating the climate effects of methane emissions, and further, proposes to increase programatic MRPRs in order to accomodate increasing biogas energy production without cutting back on the requirements for all other renewable generating sources.

CalSEIA, SEIA, CEC ETD staff: Proposes to include a special-purpose band to create a market for emerging technologies to promote their progression down the learning curve from pre-commercial to commercial.

This section of the working group report examines the areas of commonality and differences among the various proposals presented in Section III. The analysis covers all of the implementation issues addressed in Section II.B. of the report, and concentrates on those areas considered to be key to the development of a successful renewables program.

B. Positions of the Proposals with Respect to Key Issues

The six full program proposals and two adjunct proposals to implement the CPUC's renewables policy offer a wide range of options regarding the structure and design of an effective renewable energy program. The attached two-page table, titled *Features of Proposals to Implement the CPUC Renewables Policy*, presents the major issues that will be a part of any renewables program developed by the CPUC or state legislature, and summarizes

the positions of the proposals with respect to each of these issues. For the two adjunct proposals the table shows entries only for those categories that are addressed specifically by the proposals. The table illustrates the range of approaches that have been proposed to the renewables working group for dealing with the key issues that have been identified by the CPUC and the working group. The major issues are analyzed below.

1. Program Obligation Issues

a. Basis for the Obligation

The December 20, 1995, CPUC restructuring decision calls for the establishment of a minimum renewables purchase requirement (MRPR) to secure for California the variety of benefits associated with renewable energy use in the state. The decision further calls for the establishment of an effective enforcement mechanism in order to ensure compliance with the program. Each of the six comprehensive program proposals offers a distinct approach to creating and enforcing a renewables obligation in order to fulfill the CPUC's policy objectives for renewables. Five of the six proposals present strategies to implement the MRPR mechanism adopted in the CPUC restructuring decision. The EDF et. al. proposal employs an alternative approach to achieve the CPUC's policy objectives, in which the renewables program would be funded by a surcharge on electricity bills, with surcharge funds distributed to renewable energy projects as production credits on the basis of a competitive bidding program. All of the MRPR-based proposals include the use of tradable renewable energy credits to facilitate compliance and spread the costs of the program equitably across the state. Programs based on the MRPR mechanism achieve a predictable quantity of renewable energy production, with market competition used to minimize program cost. The surcharge-funded production credit approach ensures a predictable program cost, with competition for surcharge funds used to maximize the quantity of renewables generated.

Five of the six renewables policy implementation proposals included in this report are based on creating obligations for the production of renewable *energy*, as measured in kilowatt-hours of electricity. In any given period of time, the MRPR percent of defined energy must be generated from renewable generating sources, or in the case of the EDF et. al. proposal, renewable energy production credits are distributed to renewable energy generators based on their energy production. Basing a program on energy units ensures that the amount of electricity produced from renewable sources, rather than the amount of renewable generating capacity in service, is the objective of the program. This is based on the Commission's recognition that renewables make their greatest contribution by their operation, not just their availability on-line. It is also easy to monitor a program based on energy units, as electric energy routinely is metered for purposes of sales and transfers.

The NCPA proposal is based on the creation of an obligation for an MRPR percentage of generating *capacity* from renewable sources, as measured in kilowatts. The proposal includes a requirement that suppliers of qualifying renewable capacity maintain a minimum level of

energy generation that is commensurate with the generating technology in question. The capacity credit approach has the advantage that the obligation for any given period of time is based on the average monthly capacity used in the state for the previous year, and thus is determinable before each compliance period begins. Entities that are obligated to amass capacity credits know before hand how many credits they must acquire, and no true-up period is required. The capacity-credit approach is designed to minimize the uncertainty associated with annual variations in the availability of intermittent renewable generating sources (solar, wind, and especially hydro). Intermittent generators are required to bid their capacity at a level that allows qualification with regard to required energy production in poor resource years, or face derating due to failure to perform.

The requirement in the NCPA proposal that a renewable generating source provide a minimum amount of energy on an annual basis in order to qualify as having provided its certified capacity to the system in effect minimizes the difference between an energy-based MRPR and the proposed capacity-based MRPR. For example, if the administering agency determines that a given renewable technology must operate at a load factor of 80 percent in order to qualify as having met its capacity provision obligation, then bidding a generating unit using this technology at the level of 10 MW of capacity credits is equivalent to bidding a commitment of 70,000 MWh of energy to be produced over the period of a year (10 MW x 8760 h/y x 0.8). A capacity credit program that lacks this minimum production requirement would not ensure the level of renewable energy production that the NCPA proposal, or the energy-based proposals, do.

A weakness of the capacity credit approach tied to a minimum production level set differently for each renewable energy technology is that the resulting values of the credits, on a per kWh basis, would vary greatly. For example, if biomass generators were required to produce at a level of 80 percent load factor, and wind generators were required to produce at a level of 25 percent load factor, then if a capacity credit were valued at $100 per MW by the market, the biomass generator would receive a capacity value of 1.4 ¢ for each kWh produced subject to capacity credit qualification, while the wind generator would receive a value of 4.5 ¢/kWh. In other words, compared to a system based on energy credits, the capacity credit approach proposed by NCPA favors renewable generating technologies that operate at inherently lower load factors, and thus would secure for the market fewer kWhs of renewable energy per dollar cost of the program.

b. MRPRs and Program Goals

All of the proposals that are based on an MRPR set the initial level of the standard at a level that is based to some degree on the level of renewable energy generation in the state that existed at the time when the initial electric utility restructuring decision was made by the CPUC (April, 1994). Two of the proposals, IEP and NCPA, would set the initial MRPR at a level intended to obligate the amount of renewables that would have been achieved at the

expected time of enactment of the overall restructuring program (1998) had the BRPU process not been derailed. The SMUD proposal sets the initial level at the level of renewable energy produced in the state in 1994, while AWEA et. al. sets the level at 90% of the level of renewable energy produced in the state in 1993, with the ten percent reduction adopted in an effort to ensure competition among renewables. The SCE et. al. proposal attempts to achieve approximately the level of renewables production that the state experienced during the first half of the 1990s.

Most of the proposals anticipate maintaining the level of the initial MRPR at a constant value for the first three years of the program, pending a scheduled full review of the electric utility restructuring program in the year 2000. In this case the total requirement for renewables would change in proportion to changes in total energy consumption over the period (or more exactly, changes in those categories of energy consumption to which the MRPR is applied), but the renewable percentage would remain fixed. The exception to this is the AWEA et. al. proposal, which includes a provision to increase the MRPR by 0.2 percent per year over the first three years of the program. It is important to note, however, that the AWEA et. al. proposal is the only one that purposely sets the initial MRPR at a level that is below the amount of renewables produced in the state in 1993, so that even after three years of an increasing MRPR (at 0.2%/yr) the level of renewables will remain below the pre-restructuring level.

c. Technologies Included in the Programs

In its December 20, 1995, restructuring decision, the CPUC defined renewable generation technologies to include biomass (solid fuel and biogas), geothermal, solar (thermal and photovoltaic), and wind. Absent from the list of technologies, although unquestionably renewable, is hydroelectric generation. Hydro generation is and has been a cornerstone of California's electricity supply, and is one of the least-cost electric generating sources available in the state. Its inclusion in the renewables program, however, is a matter of contention among the parties to the renewables working group. Two of the six comprehensive program proposals include hydro among the eligible technologies, while the other four exclude hydro generation as an eligible technology for purposes of meeting the renewables obligation, or from applying for surcharge-funded renewable energy production credits.

The inclusion of hydroelectric generation in a renewables-support program presents both philosophical and practical issues. The major philosophical issue regards the commercial and competitive status of hydroelectric generating technology. Hydro technology is fully mature and competitive with other forms of electricity generation, and it has achieved its current market share without the kinds of incentives that were necessary to promote the development of the other renewable generating technologies that contribute to California's electricity supply today. Thus, there is a question as to whether hydro needs to be or ought to be given special incentives. Indeed, this factor is recognized by the SMUD proposal,

which includes hydro as a renewable generating option for meeting the MRPR obligation, but prohibits the trading of credits associated with existing hydro generators (i.e. those commissioned before December 20, 1995). All other renewable energy credits are tradable in the SMUD program.

Some of the practical problems associated with including hydroelectric generation in a renewables support program include:

- Many hydro generators are multipurpose facilities, providing water supply, flood control, and recreational amenities in addition to power generation. Including systems of this kind in the renewables program risks subsidizing these non-energy functions.

- If out-of-state hydro generators are deemed eligible for the program, there is a risk that Northwest hydro sources could squeeze non-hydro renewables out of the market.

- Year-to-year fluctuations in hydro availability, which tend to be more extreme than fluctuations in other renewable energy sources, will make the timely acquisition of RECs more difficult for entities required to meet MRPR-based standards.

d. Competition and Diversity of Renewable Generating Sources

Renewable energy generating resources are a disparate collection of technologies that each have their own combination of characteristics and needs in order to be able to contribute to the state's electric system. For example, some of the renewables are characterized by high capital cost, no fuel cost, and low operating cost, while others have a more conventional combination of capital and operating costs. Some of the renewables can be operated in a full or partial load-following mode, while others provide intermittent power whose output profile is uncontrollable and not synchronizable to consumer demand curves. In addition, while all renewables provide environmental, economic, and diversity benefits to California, the package of benefits associated with each technology varies considerably. Thus there is an open question as to whether different renewables can compete successfully with each other, whether head-to-head competition would eliminate some of the existing and emerging renewable generating sources from the system, and whether this should be encouraged or discouraged from a public policy perspective. The CPUC restructuring decision suggests that it might be appropriate to impose individual technology bands in order to ensure its diversity goals for renewables.

Two of the six comprehensive program proposals for the implementation of the CPUC's renewables policy include a provision for a special band within the overall program for the support of one specific renewable technology: biomass. In these proposals, entities that are obligated to acquire a given quantity of renewable energy credits will be further obligated to

ensure that a defined minimum fraction of the total REC obligation is contributed by biomass generating sources. The rationale for a special biomass band within a renewables support program is that biomass technologies provide an especially valuable package of environmental benefits including waste disposal services that are unique among the renewables, and biomass has difficulty competing with other renewables that inherently have much lower operating costs. Thus the AWEA et. al. and IEP proposals consider it to be a reasonable additional program cost to preserve a minimum level of biomass power generation in the state through the creation of a specified technology band for biomass.

The two adjunct proposals each propose an additional special purpose band or similar mechanism to be included in the renewables support program to support selected technologies. The BWG proposes a mechanism that would be geared to the mitigation of a particular environmental insult, the emission of greenhouse gases associated with the treatment and disposal of solid wastes. The rationale behind this proposal is that, as in the case of the AWEA et. al. and IEP proposals that include an environmentally-based band for the promotion of solid-fuel biomass generating sources, biogas power generation provides a significant environmental service not provided by other renewable generating sources, the mitigation of greenhouse gas emissions, and it is a reasonable deal for electricity customers to pay more than other renewables cost to receive this service.

The BWG proposal does not use the conventional band mechanism to promote biogas production because, it argues, banding is most effective in preserving a level of production already achieved, and in the case of the development of the state's biogas generation resource, there is a potential to increase the installed capacity several fold. Instead, the proposal is to create a new category of credits called "greenhouse environmental credits." Each kWh of electricity that is produced from biogas produces one associated REC, and one associated GEC. Each GEC has a value equal to that of a REC, providing a significant additional incentive to the production of electricity from biogass. In order to avoid out-competing other renewable energy sources with the increased credit allocation to biogas generators, it is proposed that increases in the installed capacity of biogas generators should be accompanied by a comensurate increase in the MRPR. The intent is to leave the requirement for non-biogas renewables unaffected by the level of biogas-generated power employed in the state.

The CalSEIA et. al. proposal proposes a band that would be used to promote the commercialization of emerging renewable generating technologies that have moved beyond the R&D stage of development, but have not yet reached the point of competitiveness with the lowest-cost renewables in the market. Temporary support of such technologies at a higher level than the expected value of the credits associated with "conventional" renewables will allow these emerging technologies to move down the learning curve and become competitive with conventional renewables and other generating sources. The special band for emerging technologies proposed by CalSEIA et. al. could be added onto any of the comprehensive

program proposals included in this report for the implementation of the CPUC's renewables policy.

None of the six comprehensive program proposals includes a provision for the commercialization of emerging technologies, arguing that the CPUC's renewables policy is intended to be a support program for competitive renewables sources, and not a mechanism for the support of technology commercialization. On the other hand, no other mechanism currently exists to provide the type of commercialization support that is the objective of the CalSEIA et. al. adjunct proposal. Since the commercialization band probably is not going to engender the level of competition that is expected within the MRPRs of the full program proposals, commercialization alternatively might be pursued via a surcharge-funded production-credit program that runs as an adjunct to the adopted renewables program.

2. Program Eligibility Issues

a. Existing Renewables

The five MRPR-based proposals make existing utility-owned and QF renewable power generators eligible to participate, on a competitive basis, in a renewable credits program. The only exception to this rule is the SMUD proposal, which includes hydro in the program, but prohibits the trading of credits associated with existing hydro generating sources. This restriction is imposed in order to limit the market power of existing hydro generating sources within the overall renewables market. The existing hydro generators are counted towards the renewables obligation of the UDC that distributes their power, but their credits are not transferable.

The EDF et. al. production credit proposal makes existing or future utility-owned renewables ineligible for bidding for or receiving renewables production credits funded by the surcharge program. Non-utility owned renewable generating sources would only be eligible to participate if their in-service date is post December 20, 1995 (the date of the CPUC restructuring decision), or if there is substantial redevelopment of a facility after that date. Thus existing QFs would not be eligible to participate in the surcharge-funded production credit program as proposed by EDF et. al. This program is designed to encourage new renewables development in the state.

One renewable energy application that presents a special set of problems from the regulatory perspective is UDC-owned renewable distributed generation. Distributed generation takes the form of smaller disbursed generating facilities located at a customer, utility or other

location. Distributed renewables include photovoltaic, wind and biomass technologies. Distributed renewable generation could be owned by UDCs , customers or third parties, such as green direct-access providers. At a customer's premisis, distributed renewables could include self-generation, third party on-site generation, or utility generation connected on either side of the meter.

Utilities and others have proposed that utility-owned distributed generation be considered T&D plant and therefore exempt from unbundling of generation from T&D. This would permit UDCs to use distributed renewables to substitute for T&D expansion, in effect, "leapfrogging" T&D congestion by moving generation closer to customers. The potential of the UDC to cross-subsidize such generation with savings on the T&D side is also an issue in restructuring, as is the locational market power concern related to the UDC's unique status among potential distributed generators as the owner of the distribution system.

Another potential issue is the power exchange purchase requirement of UDCs. Under restructuring, utilities are required to obtain energy through the power exchange. However, distributed generation may be unsuited to bidding into a power exchange due to transaction costs, non-dispatchability, line losses, infeasibility of wheeling power from distribution to transmission, etc.

The AWEA proposal states that UDC-owned distributed renewables should not qualify for RECs until these issues are resolved. The AWEA proposal would accelerate the commercialization of distributed renewables through the pass-through of T&D benefits to customers and third parties, and through the use of energy efficiency and RD&D surcharge moneys. The CalSEIA et. al. proposal would make UDC-owned "emerging" distributed renewables eligible for RECs in order to aid their commercialization, and do not address the issues described above. The EDF and SCE proposals state that UDC-owned distributed renewables should be eligible for subsidy by surcharge or RECs once the Commission has resolved functional unbundling issues. The NCPA proposal would also make UDC-owned distributed renewables eligible for RECs. The SMUD, IEP and Biogas proposals do not address the question of distributed renewables owned by UDCs..

b. Renewables Self Generation

Some of the renewable energy generated in California is used on-site by the generator, rather than being sold to the utility companies for distribution and sale. Renewable self-generation occurs in two major situations: in non-grid connected applications for which the cost of grid connection would be more expensive than the cost of installing and operating an on-site renewable generating system, and in grid-connected applications for which the generator supplies his own energy requirements from a combination of the renewable generator and the grid, and supplies net or surplus renewable power to the grid. Renewable self-generation can

vary in scale from a 200 kW solar home system to a 50 MW biomass cogeneration system associated with a pulp and paper mill.

All of the comprehensive renewables program proposals would awards RECs (or RCCs or production credits) to the quantities of renewable energy generation that grid-connected self generators provide through a utility meter (eventually) to a customer. Two of the proposals, IEP and SMUD, would also award RECs for renewably generated power that is used on-site by the generator, while the other four proposals would prohibit such power from qualifying for RECs. Practical matters such as tamper-proof metering probably could be developed to facilitate the inclusion of self-generation in a renewables program. The issue of whether the inclusion of self-generation in the renewables program might encourage electricity users to avoid public purpose charges and the CTC needs to be addressed.

c. Hybrid Generators

Renewable generating technologies that incorporate heat engines in their systems are capable of operating with both renewable and non-renewable energy sources, in a hybrid generating mode. Renewables in this category include biomass, geothermal, and solar thermal electric generation. There are technical and efficiency reasons as well as economic reasons why generating facilities using these technologies would choose to hybridize routinely with natural gas as an energy source, on both a spot and continuous basis. PURPA allows a renewable generating facility to obtain up to 25 percent of its energy input from non-renewable sources and maintain its qualifying status as renewable.

For purposes of qualifying for renewable energy credits, several approaches are possible for the treatment of hybrids, all of which are represented in the six comprehensive program proposals. The two basic approaches are: (a) pro rate the renewable portion of the generator's output for purposes of REC qualification, and (b) set a minimum renewable qualification for the generator and give full REC credit for complying facilities. Three of the proposals would assign pro-rated credits for hybrids using any combination of renewable and non-renewable energy. The other three proposals establish a 75 percent renewable qualification minimum, and award full renewable credits for generators that meet the minimum renewable rule. Two of these proposals would assign no RECs to hybrids that do not meet the minimum qualification rule, while the other allows pro-rated credits for such facilities.

d. Out-of-State Renewables

Most of the comprehensive program proposals for the implementation of the CPUC's renewables policy place no restrictions on the participation in the program of renewable generating sources that are located outside of California. Most of the proposers argue that, while restricting the program to in-state renewable generating sources would be economically desirable, placing any such restrictions in the program would be contrary to the Commerce

Clause of the Federal Constitution, which prohibits restrictions on interstate trade. The major exception to this policy is the NCPA proposal, which takes the position that restricting participation in the program to in-state renewable generating sources would be both legal and desirable. The renewables working group can not provide legal guidance on this issue.

The AWEA et. al. proposal, which places no restrictions on out-of-state generators in the RECs market, does restrict participation in the biomass BEC market to in-state biomass generators. The proposal is sensitive to Commerce Clause considerations, but believes that in the case of the biomass set-aside there is a sufficient in-state interest to allow the restriction to be applied. The rationale for restricting participation in the biomass band to in-state sources is that the reason for establishing this special band in the first place is to secure for the state the waste disposal benefits of biomass power generation, such as reductions in open agricultural burning, reductions in landfilling requirements, and reductions in forest fire risks via the removal of excess fuel from the forest. These benefits can only be obtained from generating sources that use biomass generated in California.

3. Program Administration Issues

a. Program administration.

The December 20, 1995, CPUC policy decision on electric utility restructuring expressed a preference for state-wide implementation of its renewable energy policy, which can be accomplished only through legislative enactment of the program. Due to jurisdictional limitations, CPUC programs only apply to the investor-owned, regulated electric utility sector. Most of the proposed comprehensive renewables programs are designated for state-wide application, although some of them allow for a two-phased implementation, beginning with application by the CPUC to the regulated electric utility sector, and extending in the second phase to the entire electric utility industry in the state via legislative enactment. Most of the proposals for a two-phase implementation approach would continue the program at the CPUC level regardless of the status of state-wide legislative implementation. The SCE et. al. proposal would allow for initial CPUC implementation, but would cancel the program if timely legislative enactment were not achieved. The NCPA and SMUD proposals are designed for implementation at the state level only. The IEP proposal, in an effort to facilitate the implementation of the CPUC's renewables policy, is designed around enactment at the CPUC level only. State-wide application of the program would be welcomed by the IEP, but the program is designed to achieve its full program goals with CPUC implementation.

**** Text here on how MRPRs would be set and applied during partial implementation--how do the various proposals do this? I need information for this from each of the proposals--this also goes in the Features Table.

The CPUC's electric utility restructuring program is scheduled to be implemented at the beginning of 1998, with a full program review scheduled to take place during the third year of the program's operation (2000). Most of the proposals propose programs with no sunset date, in order to create the long-term commitment that is necessary to attract investments in new renewables generating capacity. Several of the proposals point out that the programs will automatically sunset themselves when market conditions make renewables fully competitive with non-renewable electric generating sources. Two of the proposals, SCE et. al. and EDF et. al., suggest that during the overall restructuring program review scheduled for the year 2000 a specific determination be made regarding the continuation of the renewables program. The EDF et. al. program is scheduled to collect surcharge funds for a fixed period of five years, with production credits to be awarded for ten-year contract terms beginning with the in-service date of the auction winners.

The comprehensive program proposals present several different alternatives for the administration of a renewables program. Four of the proposals provide for the administration of the program to be carried out by an appropriate state agency, with the CEC named specifically in the NCPA proposal. The AWEA et. al. proposal allows for either a state or private agency to act as administrator. The SMUD proposal calls for administration of the program to be conducted by means of the wholesale power exchange and independent system operator, which will be created as new institutions during the first phase of the implementation of the CPUC's overall restructuring program. The IEP proposal takes a different approach, assigning administrative duties to the UDCs (utility distribution companies) that will be created as part of the restructuring process. The IEP proposal does depend on state agencies to provide certification standards and services to the renewables program.

b. Compliance and Enforcement

The CPUC restructuring decision calls for the enactment of a renewables program that is supported by effective compliance and enforcement provisions. Each of the comprehensive proposals takes a different approach to addressing this aspect of the program. The AWEA et. al. proposal would impose a high, punitive penalty (6 ¢/kWh) on electricity providers that fail to acquire a sufficient quantity of RECs to meet their program obligation, with the intention of ensuring full compliance at all times. The penalty is applied to the shortfall in a provider's renewables obligation. Full compliance is further assured by setting the initial MRPR at a level that can be met with only 90 percent of the renewables production actually produced during 1993. The proposal states that the penalty provision is not imposed as a means of capping the cost of the renewables program, and that no penalty funds are expected to be collected.

The IEP proposal emphasizes voluntary compliance through direct-access green marketing, and requires the UDCs to acquire enough additional renewable energy credits to meet the MRPR standard, with the cost billed as a line-item charge to all UDC customers, including direct-access customers. The line-item charge will be applied in the same manner as public purpose charges or the CTC. Direct-access customers of certified "green-energy" providers will not be assessed the line-item charge. "Green-energy" certification will require providers to at least meet the MRPR standard in their portfolio of resource supply. The UDCs are responsible for administering the program, and demonstrating that the MRPR is met. Enforcement of this responsibility will be carried out as one aspect of the PBR regulatory process to which the UDCs will be subject in the restructured electricity market. No penalties are assessed, and the program does not have a cost cap.

The NCPA proposal gives the CEC responsibility for administering and enforcing the renewables program. Electricity providers subject to the program are required to surrender the required number of RCCs, or face a penalty payment of 1 mill per kWh assessed to their entire volume of power sales. The penalty acts as a cost cap for the program, and all penalty funds collected would be devoted to renewables R&D. A drawback to a penalty that is assessed to a provider's entire sales volume is that it does not provide an incentive to achieve partial compliance in cases where a provider cannot achieve full compliance at a cost that is below the cap. In such cases a provider might choose to pay the penalty in lieu of participation in the program, which could suppress the value of RCCs across the board.

The SCE et. al. proposal includes provisions for a 2 ¢/kWh price ceiling to be applied to the shortfall of RECs that a provider is obligated to acquire. This ceiling price is intended by the proposers to be a cost cap for the renewables program. Funds collected from ceiling payments made in lieu of the acquisition of RECs could be used to reduce the CTC, or to promote the development of new renewables.

The SMUD proposal does not address the issue of penalties and enforcement in their proposal.

The EDF et. al. proposal is based on a surcharge-funded program rather than the establishment of an MRPR, so enforcement requirements for the program are different than for the MRPR-based proposals. The program is constructed around the use of a cost cap, which is the level at which the program is administratively funded. The proposers envision a program cost of $125 million, assuming the program is enacted on a state-wide basis. Compliance incentives or penalties are not a part of this type of program. The program funds would be administered by a state agency.

The two major tools that can be used to promote renewable energy production are:

1. A standard (the MRPR) specifying the minimum amount of renewable energy that must be produced.

2. A program cost cap that determines the maximum amount that will be spent on the support of renewable energy production.

The CPUC's December 20, 1995 decision on restructuring specifies the use of an MRPR standard to achieve its objectives for renewable energy. The decision leaves open the issue of whether to impose a cost cap on the program. The AWEA et. al. and IEP proposals rely entirely on the use of an MRPR standard for meeting the Commission's objectives, while the EDF et. al. proposal relies entirely on the use of a program cost cap. Proposals that employ both a standard and an effective cost cap become blends of the two approaches, with outcomes in terms of renewable energy production that can be manipulated by adjustments of either variable. If the cap is used as the more restrictive tool, then it is unlikely that the MRPR program standard will be achieved.

c. Renewable Credits and Credit Markets

The CPUC's restructuring decision adopts a renewables program based on an MRPR that is intended to be applied state-wide to all electricity sales to end users. In order to facilitate compliance and minimize program cost, the decision envisions the creation of a market for the trading of renewable energy credits, allowing electricity providers in the state that are deficient in renewable generating resources to fulfill their obligation by purchasing credits that are available from renewable energy used anywhere in the state. Renewable energy generators benefit by having two commodities to sell, renewable energy and its associated RECs. The value of the RECs, which will be tempered by market competition, will provide the incentive that renewables generators need in order to be able to compete in the restructured market. If and when renewables can compete head-to-head with other generating sources, the value of the RECs can be expected to be bid down to insignificance. The five MRPR-based proposals offer several alternatives for the structuring of a competitive REC market.

Most of the proposals are non-specific with respect to the structure or mechanism of the market that would be created for the trading of RECs. The proposals would allow a variety of transfer mechanisms to develop, including bilateral contracts, packaged energy and REC sales contracts, long-term contracts, and spot sales. In most proposals, providers of energy to California end users are obligated to acquire a quantity of RECs sufficient to satisfy their MRPR obligation. These RECs are surrendered to the designated administrator at the end of each compliance period.

The SMUD proposal offers a different approach to the operation of a REC market, taking advantage of the creation of the wholesale power exchange and independent system operator (ISO) as part of the restructuring process. The power exchange will purchase all power to be

grid-distributed in the state as restructuring is implemented, and will be responsible for the acquisition of power at lowest cost. The ISO will be responsible for ensuring that system integrity and reliability standards are maintained. It would be a natural extension to have the exchange also be responsible for acquiring the necessary quantity of RECs, with the cost distributed proportionally to electric service providers as they take power from the exchange for distribution to California end users. The ISO could be charged with ensuring that a timely and reliable supply of RECs are being acquired to meet the MRPR standard. The exchange would be given the same latitude to balance firm and spot REC purchases as it has for energy purchases. This system would avoid the market power problem that could be a problem in a market operating with a limited number of purchasers of RECs.

c.1. RECs from Energy Sold Under Existing PPAs

All of the MRPR proposals agree that the generator of a REC may sell that REC, just as he sells his output of kWhs. In situations where renewable energy is being sold under long-term power-purchase agreements (PPA) that pre-date market restructuring, however, there is an area of major uncertainty regarding the assignment of the RECs. Since the RECs did not exist at the time the PPAs were formulated, there is no specification regarding REC transfer in these contracts. This is an issue of considerable significance for the implementation of an MRPR program, as much of the renewable generating capacity that will be available during the enactment of the program will be bound by existing, long-term PPAs, some of which extend more than twenty years beyond the planned restructuring implementation date.

The proposals that offer a directed solution to the issue of assignment of RECs for renewable energy sold under pre-restructuring PPAs agree that in cases where renewable energy is being sold under the fixed-price schedules included in standard-offer PPAs (specifically interim standard offer #4 PPAs with the appropriate selections made), the RECs associated with this energy would be considered to be packaged with the energy, and the property of the purchaser. The fixed-price schedules are sufficiently above current market prices for energy to be deemed to include the value of both the energy and the associated RECs.

There is considerable disagreement, however, over the issue of assignment of RECs associated with energy that is being sold under pre-restructuring long-term PPAs, when energy is sold at the short-run avoided cost (SRAC) rate, and capacity is sold at long-term levelized contract rates. The AWEA et. Al. And IEP proposals assign all RECs associated with energy sold at SRAC to the generator. This means that the generator would receive the benefits of the newly-created RECs, which were not anticipated during the negotiation of the original PPAs. The SCE et. al., and SMUD proposals assign all RECs sold under pre-restructuring long-term PPAs to the purchaser, which would mean that facilities selling power at SRAC and capacity under long-term contract would not have any direct access to the benefits associated with the REC market. To the extent that the renewables program is being developed in anticipation of the fact that renewable power generators will have trouble competing without a such a

program in a restructured electricity market, the assignment of RECs associated with energy sold subject to SRAC and long-term capacity sales may limit the ability of the program to make these generators competitive, although purchasers of this power would have an interest in keeping the power in production in order to ensure that the RECs are generated.

The NCPA proposal addresses the issue of the assignment of RECs (in their case, RCCs) associated with renewable power sold under pre-restructuring PPAs by directing the parties to the contracts to negotiate the disposition of the soon-to-be created RECs. This may be the only fair and legal solution to the problem, and it is likely to be a contentious process. Facilitation and/or mediation may be desirable to forge agreements.

c.2. Competition and Marketing of RECs

The overall restructuring of the electricity market is predicated on the goal of making the market more competitive. The CPUC's renewables policy, too, is intended to be subject to the rigors of market competition. Such competition can take a variety of forms. The broadest possible competition, which would lead to the lowest possible program cost (or maximum renewables production under the production credit program), would allow all renewables to compete together, both among different technologies, and between existing and new generating installations. Competition among different renewables technologies has been discussed previously under heading A.1.d. *Maintaining Renewables Diversity*.

The restructuring decision's policy goals for renewables include both maintaining the existing diversity of renewable generating sources, and encouraging the development of new renewables. The development of new renewable generating sources will be very difficult unless long-term contracts for sales of renewable energy and RECs can be obtained by developers hoping to secure funding for their projects. Most of the proposals leave the development of REC and renewable energy contracts to the market, without attempting to create conditions programmatically that would promote the development of new renewable generating facilities. The EDF production credit proposal, in contrast, is for a program that would be tailored to the development of new renewables, offering winning bidders ten-year commitments for the payment of production credits, and barring existing facilities from participating in the bidding program.

The CPUC restructuring decision relies on the creation of an enforceable standard to achieve its policy goals for renewables. The decision does not address the issue of green marketing directly. The renewables working group, however, has asked each of the proposers to address the issue of how green marketing might fit into the context of their proposal. The IEP proposal, in fact, is designed around the concept of using green power marketing to achieve through voluntary means the bulk of the compliance that will be necessitated by the MRPR standard included as part of their proposal.

Green marketing of power is not a major ingredient of any of the other renewable program proposals, although two of the proposals, AWEA et. al. and SCE et. al., discuss a mechanism by which green marketing techniques could be used to increase the total program obligation for the generation of renewable energy. In each of these proposals, each electric services provider in the state is obligated to acquire RECs representing the MRPR fraction of its energy supply. Green marketing could be used by environmental organizations, for example, to competitively purchase and remove RECs from the system, increasing the total quantity of RECs that are necessary to fulfill the state's collective mandated program obligation. "Green" direct-access providers who purchase some multiplier greater than the MRPR standard of RECs for their portfolio of sources would have the same effect on the composite state market. If the program is enforced by a penalty that is lower in value than the marginal cost of the volume of RECs needed for state-wide compliance, however, green marketing of this variety would not be effective in increasing state-wide renewables use beyond the level mandated by the MRPR.

C. Areas of Commonality and Difference Among the Proposals

While there is no unanimity of opinion on any of the major issues considered by the working group, there are some important areas of broad consensus. One area on which every member of the group agrees is the importance of renewable energy for California's future. Virtually all participants in the working group would like to preserve the current renewable energy generation infrastructure in California, and provide for its future growth and health. There is a broad consensus that the best way to accomplish this goal is through the use of market competition to the maximum extent possible, with a system that is flexible enough to facilitate compliance with regulatory obligations.

The working group did not reach full consensus on the approach to be taken in formulating a renewables program for California. Five of the six comprehensive program proposals are for the implementation of a program based on the use of an MRPR standard, in accordance with the CPUC electric utility restructing decision. The sixth proposal, which has a considerable sponsor list, asks the Commission to reverse its decision with respect to structuring a renewables program, and adopt a surcharge-funded program with auction-allocated production credits. The issue is whether to base the program on a performance standard, or on a mandated program cost.

With the regard to the issue of what technologies are eligible to participate in the program, there is a consensus that all of the technologies listed as eligible for the renewables program in the CPUC restructuring decision, including biomass, geothermal, solar thermal and photovoltaic, and wind, should be eligible for the program. The group is not able to form a consensus on whether to include hydroelectric generation in the program, and if hydro is included, how to address the special issues that hydro inclusion entails.

There is broad consensus within the working group on the concept of state-wide, uniform application of the renewables program. The group agreed that all of the state's electricity users should share in the cost of the program on an equitable basis, with a variety of approaches proposed to accomplish this goal. There is also a group consensus on the concept that the obligation to comply with an MRPR standard should be imposed on the providers of electric services to end users, which may include entities such as utility distribution companies, direct-access electric providers, and municipal utilities. None of the proposals would impose an obligation on the state's electricity generators. In most proposals the electric services providers would be responsible for acquiring the requisite quantity of RECs determined by the MRPR percentage of their sales volume during each compliance period. If the wholesale power exchange conducts the REC auction, then the ISO would be responsible for ensuring that the required amount of RECs are sold into the market, with each provider charged a proportional amount to cover the costs of the auction based on its sales volume.

There is also broad consensus on the concept of separable energy and renewable energy credits, with renewable energy generators free to market their production of energy and credits to different buyers. Efficient markets for the trading of renewable energy credits will enable the cost of the program to be spread equitably over the state's entire base of electricity end users, while allowing renewable energy project developers to pursue the most economical renewables opportunities available in the state. The group's consensus on this subject does not extend to the issue of allocation of RECs for renewable energy producers selling power under existing power purchase agreements, which in most cases are binding, exclusive sales contracts but do not anticipate the existence of RECs. This is an issue that will require attention as the renewables program is developed.

There is a broad consensus within the group that the renewables program should emphasize competition among renewables to the maximum extent possible, with special consideration given to biomass technologies in some of the proposals in respect to the special environmental services provided by this generating source. Many in the group agreed that the core renewables program should be used for the support of the most economical portfolio of renewables that the market could find, and that it should not be used to support activities that would properly come under the purview of an RD&D program. There is a broad group of renewable energy technologies, including many in the category of conversion of solar energy to electricity, that currently can be classified as lying somewhere in between the categories of RD&D technologies and commercial renewables. California companies are among the world leaders in the development of some of these technologies. Most of the working group participants agree that it would be desirable to support the continuing commercial development of these technologies, but there was no consensus on how to accomplish this goal. The CalSEIA et. al. proposal is aimed at providing a mechanism to encourage the commercial development of emerging renewable energy technologies.